



# UMI REFERENCE CARD

## FOR THE VIC 20®

UNITED MICROWARE INDUSTRIES, INC. 3431 H Pomona Blvd., Pomona, CA 91768 VIC20 is a registered trademark of Commodore Business Machines

### USER CALLABLE KERNEL ROUTINES

NAME	ADDRESS	FUNCTION
ACPTR	\$FFA5	Input byte from IEEE bus
CHKIN	\$FFC6	Open logical file in R(X) for input
CHKOUT	\$FFC9	Open logical file in R(X) for output
CHRIN	\$FFCF	Input character from channel
CHROUT	\$FFD2	Output byte in R(A) to channel
CIOUT	\$FFA8	Output byte in R(A) to IEEE (serial) bus
CLALL	\$FFE7	Close all files
CLOSE	\$FFC3	Close logical file in R(A)
CLRCHN	\$FFCC	Close all open channels and restore default channels
GETIN	\$FFE4	Get character from keyboard; character is in R(A)
IOBASE	\$FFF3	Returns address of I/O page in R(X), R(Y)
LISTEN	\$FFB1	Command device # in R(A) to listen with attention
LOAD	\$FFD5	Load from device; R(A)=0 for load, 1 for verify
MEMBOT	\$FF9C	Sets bottom of memory to R(X), R(Y) if carry clear reads bottom of memory in R(X), R(Y) if carry set
MEMTOP	\$FF99	Sets top of memory to R(X), R(Y) if carry clear reads bottom of memory in R(X), R(Y) if carry set
OPEN	\$FFC0	Open file determined by SETLFS and SETNAM
PLOT	\$FFF0	Move cursor to R(X), R(Y) if carry clear read cursor position into R(X), R(Y) if carry set
RDTIM	\$FFDE	Read time (hhmmss) into R(A), R(X), R(Y)
READST	\$FFB7	Read current I/O status and return in R(A)
RESTOR	\$FF87	Restore system default vectors
SAVE	\$FFD8	Save from MEMBOT to R(X), R(Y)
SCNKEY	\$FF9F	Scan keyboard; if key pressed, store in buffer
SCREEN	\$FFED	Read organization of screen into R(X), R(Y)
SECOND	\$FF93	Set secondary address after call to LISTEN
SETLFS	\$FFBA	Set logical file #, device #, and secondary address
SETMSG	\$FF90	Control printing of messages (uses bits 6, 7 of R(A))
SETNAM	\$FFBD	Set filename — R(A)=length, R(X), R(Y)=lo, hi pointer to filename
SETTIM	\$FFDB	Set time
SETMO	\$FFA2	Set IEEE (serial) timeouts
STOP	\$FFE1	Check for stop key
TALK	\$FFB4	Command device in R(A) to talk
TKSA	\$FF96	Set secondary address for TALK (sa in R(A))
UDTIM	\$FFEA	Update time
UNLSN	\$FFAE	Unlisten IEEE (serial) device
UNTLK	\$FFAB	Untalk IEEE (serial) device
VECTOR	\$FF84	Change system vectors

### BASIC TOKENS

128	END	167	THEN
129	FOR	168	NOT
130	NEXT	169	STEP
131	DATA	170	+
132	INPUT #	171	-
133	INPUT	172	.
134	DIM	173	/
135	READ	174	↑
136	LET	175	AND
137	GOTO	176	OR
138	RUN	177	>
139	IF	178	=
140	RESTORE	179	<
141	GOSUB	180	SGN
142	RETURN	181	INT
143	REM	182	ABS
144	STOP	183	USR
145	ON	184	FRE
146	WAIT	185	POS
147	LOAD	186	SQR
148	SAVE	187	RND
149	VERIFY	188	LOG
150	DEF	189	EXP
151	POKE	190	COS
152	PRINT #	191	SIN
153	PRINT	192	TAN
154	CONT	193	ATN
156	LIST	194	PEEK
157	CLR	195	LEN
158	CMD	196	STR\$
159	SYS	197	VAL
160	OPEN	198	ASC
161	CLOSE	199	CHR\$
162	GET	200	LEFT\$
163	NEW	201	RIGHT\$
164	TAB <	202	MID\$
165	TO	203	- 254 unused
166	SPC <	255	π

### EEKS AND POOKS

#### COLOR

POKE 646,X	Set current color code
POKE 36879,X	Set screen and border color

#### LIGHT PEN

PEEK (36870)	Horizontal position of light pen
PEEK (36871)	Vertical position of light pen

#### KEYBOARD

POKE 650,128	Make all keys repeat
PEEK (203)	Which key pressed (64 if none)
PEEK (198)	# of character in keyboard buffer

#### SOUND

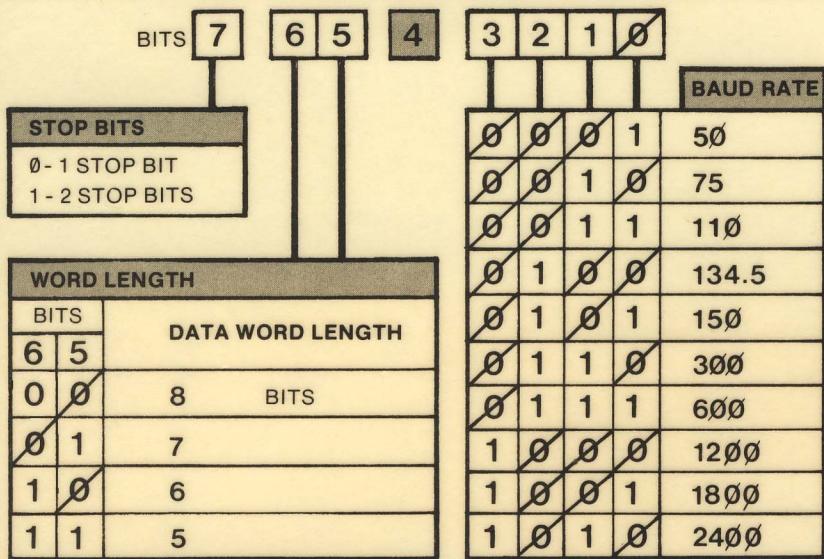
POKE 36874,X	Set frequency of low oscillator
POKE 36875,X	Set frequency of mid oscillator
POKE 36876,X	Set frequency of high oscillator
POKE 36877,X	Set frequency of noise oscillator
POKE 36878,X	Set volume

#### USER PORT

POKE 37138,O	Set all bits for input
POKE 37136,X	Set all bits for output
POKE 37136,X	Data register (input/output)

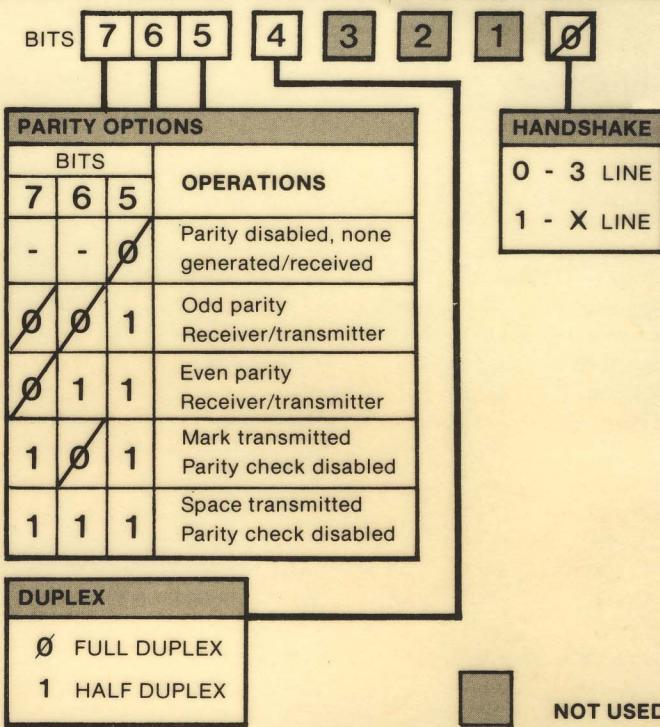
# RS - 232 REGISTERS

## CONTROL REGISTER



**BASIC SYNTAX:** OPEN#If, 2, 0, "<control register><command register>"  
 If — Normal logical file id (1 - 255). If > 127 then linefeed follows carriage return  
 <control register> — Single byte character required to specify baud rate.  
 <control register> — Single byte character NOT required.

## COMMAND REGISTER



## SCREEN AND BORDER COLOR COMBINATIONS

POKE 36879, X

### BORDER

BLK	WHT	RED	CYAN	PUR	GRN	BLU	YEL	ORANGE	LT. OR	PINK	LT. CYAN	LT. PUR	LT. GRN	LT. BLU	LT. YEL	
BLACK	8	9	10	11	12	13	14	15	136	152	168	184	200	216	232	248
WHITE	24	25	26	27	28	29	30	31	137	153	169	185	201	217	233	249
RED	40	41	42	43	44	45	46	47	138	154	170	186	202	218	234	250
CYAN	56	57	58	59	60	61	62	63	139	155	171	187	203	219	235	251
PURPLE	72	73	74	75	76	77	78	79	140	156	172	188	204	220	236	252
GREEN	88	89	90	91	92	93	94	95	141	157	173	189	205	221	237	253
BLUE	104	105	106	107	108	109	110	111	142	158	174	190	206	222	238	254
YELLOW	120	121	122	123	124	125	126	127	143	159	175	191	207	223	239	255

## TABLE OF MUSICAL NOTES

APPROX. NOTE	APPROX. VALUE						
C	135	A#	187	G#	217	F#	233
C#	143	B	191	A	219	G	235
D	147	C	195	A#	221	G#	236
D#	151	C#	199	B	223	A	237
E	159	D	201	C	225	A#	238
F	163	D#	203	C#	227	B	239
F#	167	E	207	D	228	C	240
G	175	F	209	D#	229	C#	241
G#	179	F#	212	E	231		
A	183	G	215	F	232		

### SPEAKER COMMANDS: WHERE X CAN BE: FUNCTION

POKE 36878, X	0 to 15	sets volume
POKE 36874, X	128 to 255	plays tone
POKE 36875, X	128 to 255	plays tone
POKE 36876, X	128 to 255	plays tone
POKE 36877, X	128 to 255	plays "noise"

## VIC MEMORY MAP

